DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN) (OPCI - (203092A_611)

PRUEBA DE HABILIDADES

GRUPO

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INTEGRANTE

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TABLA DE CONTENIDO

INTRODUCCIÓN

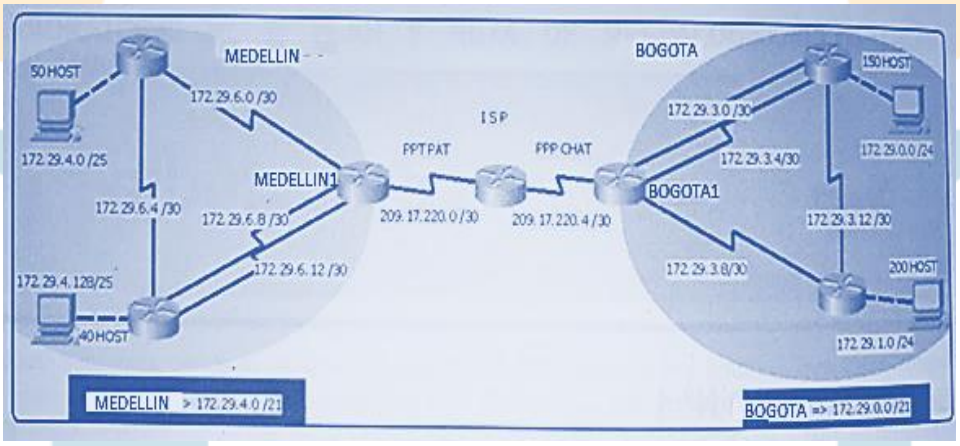
La evaluación denominada “Prueba de habilidades prácticas”, forma parte de las actividades evaluativas del Diplomado de Profundización CCNA, y busca identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado. Lo esencial es poner a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

A continuación se elaboran dos escenarios correspondientes a la temática de implementación de soluciones soportadas en enrutamiento avanzado como etapa final del curso Diplomado de Profundización CCNA.

ESCENARIO 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá y Medellín, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

TOPOLOGIA DE RED.



Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendran rutas por defecto redistribuidas; asimismo, habilitar el encapsulamiento PPP y su autenticación.

Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad.

Debe configurar PPP en los enlaces hacia el ISP, con autenticación.

Debe habilitar NAT de sobrecarga en los routers Bogota1 y medellin1.

DESARROLLO ESCENARIO No 1

A continuación comenzaremos la labor de esta actividad. Inicialmente realizaremos las rutinas correspondiente a diagnostico y alistamiento de los equipos para poder realizar la respectiva configuración (como asignación de nombres, claves de seguridad, etc).

```
MEDELLIN2(config)#hostname MEDELLIN2
MEDELLIN2(config)#no ip domain-lookup
MEDELLIN2(config)#service password-encryption
MEDELLIN2(config)#enable secret class
MEDELLIN2(config)#line console 0
MEDELLIN2(config-line)#password cisco
MEDELLIN2(config-line)#login
MEDELLIN2(config-line)#LINE VTY 0 15
MEDELLIN2(config-line)#password cisco
MEDELLIN2(config-line)#login
```

```
MEDELLIN3(config)#hostname MEDELLIN3
MEDELLIN3(config)#no ip domain-lookup
MEDELLIN3(config)#service password-encryption
MEDELLIN3(config)#enable secret class
MEDELLIN3(config)#line console 0
MEDELLIN3(config-line)#password cisco
MEDELLIN3(config-line)#login
MEDELLIN3(config-line)#LINE VTY 0 15
MEDELLIN3(config-line)#password cisco
MEDELLIN3(config-line)#login
```

```
ISP(config)#no ip domain-lookup
ISP(config)#service password-encryption
ISP(config)#enable secret class
ISP(config)#line console 0
ISP(config-line)#password cisco
ISP(config-line)#login
ISP(config-line)#LINE VTY 0 15
ISP(config-line)#password cisco
ISP(config-line)#login
```

```
MEDELLIN>ENABLE
MEDELLIN#CONF T
```

Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#hostname MEDELLIN1
MEDELLIN1(config)#no ip domain-lookup
MEDELLIN1(config)#service password-encryption
MEDELLIN1(config)#enable secret class
MEDELLIN1(config)#line console 0
MEDELLIN1(config-line)#password cisco
MEDELLIN1(config-line)#login
MEDELLIN1(config-line)#LINE VTY 0 15
MEDELLIN1(config-line)#password cisco
MEDELLIN1(config-line)#login

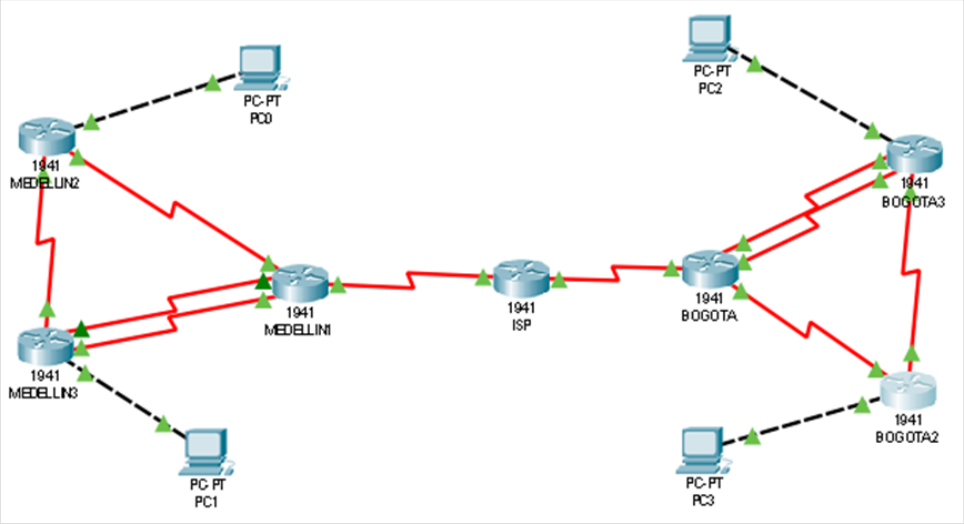
BOGOTA>ENABLE
BOGOTA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#no ip domain-lookup
BOGOTA(config)#service password-encryption
BOGOTA(config)#enable secret class
BOGOTA(config)#line console 0
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login
BOGOTA(config-line)#LINE VTY 0 15
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA2
BOGOTA2(config)#no ip domain-lookup
BOGOTA2(config)#service password-encryption
BOGOTA2(config)#enable secret class
BOGOTA2(config)#line console 0
BOGOTA2(config-line)#password cisco
BOGOTA2(config-line)#login
BOGOTA2(config-line)#LINE VTY 0 15
BOGOTA2(config-line)#password cisco
BOGOTA2(config-line)#login

Router>enable
Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA3
BOGOTA3(config)#no ip domain-lookup
BOGOTA3(config)#service password-encryption
BOGOTA3(config)#enable secret class
BOGOTA3(config)#line console 0
BOGOTA3(config-line)#password cisco
BOGOTA3(config-line)#login
BOGOTA3(config-line)#LINE VTY 0 15
BOGOTA3(config-line)#password cisco
BOGOTA3(config-line)#login

Ahora realizaremos la conexión física de equipos basados en la topología de red y se procede a configurar la topología de red según las siguientes especificaciones:



PARTE 1: CONFIGURACION DEL ENRUTAMIENTO.

a. Configurar el enrutamiento en la red usando el protocolo RIP versión 2, declare la red principal, desactive la sumarización automática.

DESARROLLO:

Router ISP

```
Router>ENABLE
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 209.17.220.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
```

ROUTER_MEDELLIN1

```
Router>ENABLE
Router#CONF T
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.2 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.13 255.255.255.252
```

Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#

ROUTER_MEDELLIN2

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.2 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.4.1 255.255.255.128
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

ROUTER_MEDELLIN3

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.10 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed st
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.14 255.255.255.252
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.6 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.4.129 255.255.255.128
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
Router(config-if)#

BOGOTA1
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.6 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.3.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.3.5 255.255.255.252
Router(config-if)#clock rate 4000000

Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#

BOGOTA2

Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.1.1 255.255.255.0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
Router(config-if)#int s0/0/0
Router(config-if)#ip address 172.29.3.10 255.255.255.252
Router(config-if)#no shut
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
Router(config-if)#

BOGOTA3

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.2 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#int
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.6 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.3.6 255.255.255.252
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
% 172.29.3.4 overlaps with Serial0/0/1
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.0.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
Router(config-if)#

CONFIGURACIÓN RIP

MEDELLIN1

Router>ENABLE
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.6.0/30 is directly connected, Serial0/0/1
C 172.29.6.8/30 is directly connected, Serial0/1/0
C 172.29.6.12/30 is directly connected, Serial0/1/1
C 209.17.220.0/30 is directly connected, Serial0/0/0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface s0/0/0
Router(config-router)#

MEDELLIN2

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
Router(config-router)#network 172.29.4.0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.4
Router(config-router)#passive-interface g0/0
Router(config-router)#

MEDELLIN3

```
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
 C   172.29.4.128/25  is directly connected, GigabitEthernet0/0
 C   172.29.6.4/30  is directly connected, Serial0/1/0
 C   172.29.6.8/30  is directly connected, Serial0/0/0
 C   172.29.6.12/30  is directly connected, Serial0/0/1
Router(config-router)#network 172.29.4.128
Router(config-router)#network 172.29.6.4
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

BOGOTA1

```
Router>
Router>ENABLE
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
 C   172.29.3.0/30  is directly connected, Serial0/1/0
 C   172.29.3.4/30  is directly connected, Serial0/1/1
 C   172.29.3.8/30  is directly connected, Serial0/0/1
 C   209.17.220.4/30  is directly connected, Serial0/0/0
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.8
Router(config-router)#passive-interface s0/0/0
Router(config-router)#
```

BOGOTA2

```
Router(config-router)#
Router(config-router)#
Router(config-router)#do show ip route connected
```

```
 C   172.29.1.0/24  is directly connected, GigabitEthernet0/0
 C   172.29.3.8/30  is directly connected, Serial0/0/0
 C   172.29.3.12/30  is directly connected, Serial0/0/1
Router(config-router)#exit
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
 C   172.29.1.0/24  is directly connected, GigabitEthernet0/0
 C   172.29.3.8/30  is directly connected, Serial0/0/0
 C   172.29.3.12/30  is directly connected, Serial0/0/1
Router(config-router)#network 172.29.1.0
Router(config-router)#network 172.29.3.8
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

BOGOTA3

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
 C   172.29.0.0/24  is directly connected, GigabitEthernet0/0
 C   172.29.3.0/30  is directly connected, Serial0/0/0
 C   172.29.3.4/30  is directly connected, Serial0/0/1
 C   172.29.3.12/30  is directly connected, Serial0/1/0
Router(config-router)#network 172.29.0.0
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

PARTE 1: CONFIGURACION DEL ENRUTAMIENTO.

b. Los routers Bogota1 y Medellín deberán añadir a su configuración de enrutamiento una ruta por defecto hacia el ISP y, a su vez, redistribuirla dentro de las publicaciones de RIP.

DESARROLLO:

ROUTER MEDELLIN1

```
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.1
Router(config)#router rip
Router(config-router)#default-information originate
Router(config-router)#
```

ROUTER BOGOTA1

```
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5
Router(config)#route rip
Router(config-router)#default-information origina
Router(config-router)#
```

PARTE 1: CONFIGURACION DEL ENRUTAMIENTO.

c. El router ISP deberá tener una ruta estática dirigida hacia cada red interna de Bogotá y Medellín para el caso se sumarizan las subredes de cada uno a /22.

DESARROLLO.

```
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip route 172.29.4.0 255.255.252.0 209.17.220.2
Router(config)#ip route 172.29.0.0 255.255.252.0 209.17.220.6
Router(config)#
```

PARTE 2: TABLA DE ENRUTAMIENTO..

a. Verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas.

DESARROLLO.

ENRUTAMIENTO ROUTER BOGOTA.

```
inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 209.17.220.5 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R       172.29.0.0/24 [120/1] via 172.29.3.6, 00:00:02, Serial0/1/1
                      [120/1] via 172.29.3.2, 00:00:02, Serial0/1/0
R       172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:25, Serial0/0/1
C       172.29.3.0/30 is directly connected, Serial0/1/0
L       172.29.3.1/32 is directly connected, Serial0/1/0
C       172.29.3.4/30 is directly connected, Serial0/1/1
L       172.29.3.5/32 is directly connected, Serial0/1/1
C       172.29.3.8/30 is directly connected, Serial0/0/1
L       172.29.3.9/32 is directly connected, Serial0/0/1
R       172.29.3.12/30 [120/1] via 172.29.3.10, 00:00:25, Serial0/0/1
                       [120/1] via 172.29.3.6, 00:00:02, Serial0/1/1
                       [120/1] via 172.29.3.2, 00:00:02, Serial0/1/0
     209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.17.220.4/30 is directly connected, Serial0/0/0
L       209.17.220.6/32 is directly connected, Serial0/0/0
S*   0.0.0.0/0 [1/0] via 209.17.220.5

Router#
```

ENRUTAMIENTO ROUTER MEDELLIN.

```
       P - periodic downloaded static route

Gateway of last resort is 209.17.220.1 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R       172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:24, Serial0/0/1
R       172.29.4.128/25 [120/1] via 172.29.6.14, 00:00:18,
Serial0/1/1
                        [120/1] via 172.29.6.10, 00:00:18,
Serial0/1/0
C       172.29.6.0/30 is directly connected, Serial0/0/1
L       172.29.6.1/32 is directly connected, Serial0/0/1
R       172.29.6.4/30 [120/1] via 172.29.6.2, 00:00:24, Serial0/0/1
                      [120/1] via 172.29.6.14, 00:00:18, Serial0/1/1
                      [120/1] via 172.29.6.10, 00:00:18, Serial0/1/0
C       172.29.6.8/30 is directly connected, Serial0/1/0
L       172.29.6.9/32 is directly connected, Serial0/1/0
C       172.29.6.12/30 is directly connected, Serial0/1/1
L       172.29.6.13/32 is directly connected, Serial0/1/1
     209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.17.220.0/30 is directly connected, Serial0/0/0
L       209.17.220.2/32 is directly connected, Serial0/0/0
S*   0.0.0.0/0 [1/0] via 209.17.220.1

Router#
```

PARTE 2: TABLA DE ENRUTAMIENTO..

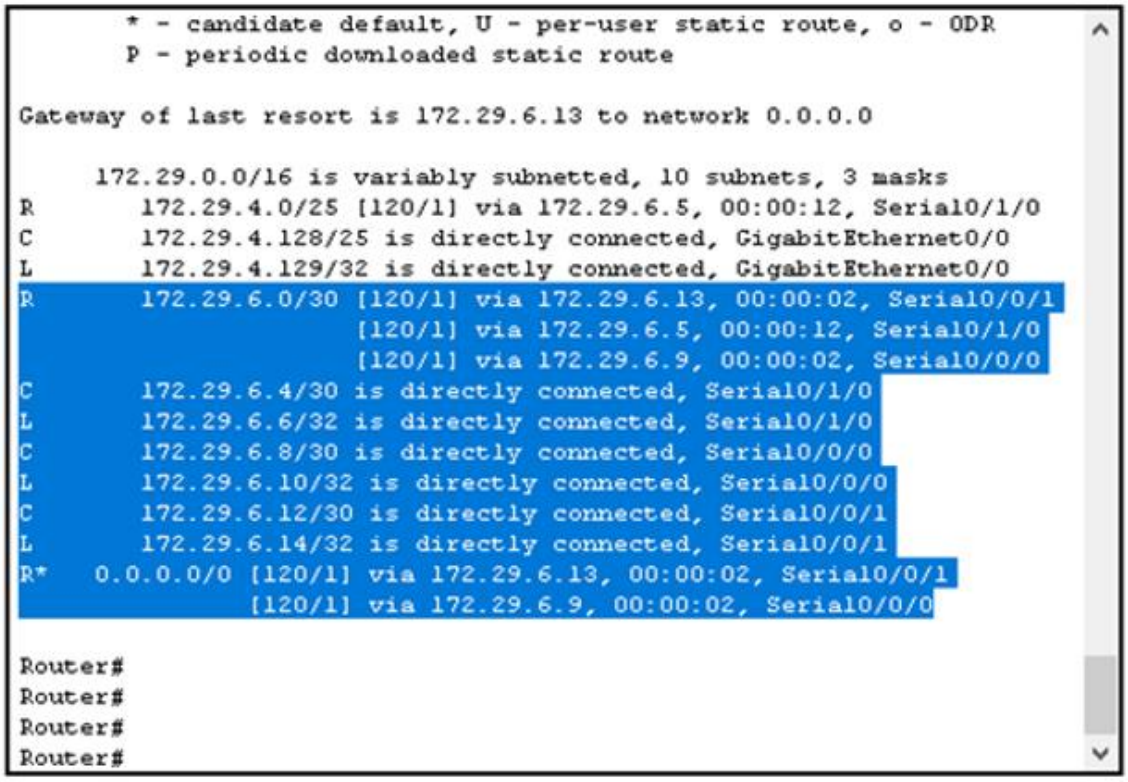
b. Verificar el balanceo de carga que presentan los routers.

DESARROLLO.

BALANCEO DE CARGA ROUTER 3.

```
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 172.29.3.1 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C       172.29.0.0/24 is directly connected, GigabitEthernet0/0
L       172.29.0.1/32 is directly connected, GigabitEthernet0/0
R       172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:03, Serial0/1/0
C       172.29.3.0/30 is directly connected, Serial0/0/0
L       172.29.3.2/32 is directly connected, Serial0/0/0
C       172.29.3.4/30 is directly connected, Serial0/0/1
L       172.29.3.6/32 is directly connected, Serial0/0/1
R       172.29.3.8/30 [120/1] via 172.29.3.13, 00:00:03, Serial0/1/0
                      [120/1] via 172.29.3.1, 00:00:07, Serial0/0/0
                      [120/1] via 172.29.3.5, 00:00:07, Serial0/0/1
C       172.29.3.12/30 is directly connected, Serial0/1/0
L       172.29.3.14/32 is directly connected, Serial0/1/0
R*   0.0.0.0/0 [120/1] via 172.29.3.1, 00:00:07, Serial0/0/0
               [120/1] via 172.29.3.5, 00:00:07, Serial0/0/1

Router#
Router#
```

BALANCEO DE CARGA ROUTER MEDELLIN3.



```
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 172.29.6.13 to network 0.0.0.0

     172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
R       172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:12, Serial0/1/0
C       172.29.4.128/25 is directly connected, GigabitEthernet0/0
L       172.29.4.129/32 is directly connected, GigabitEthernet0/0
R       172.29.6.0/30 [120/1] via 172.29.6.13, 00:00:02, Serial0/0/1
                      [120/1] via 172.29.6.5, 00:00:12, Serial0/1/0
                      [120/1] via 172.29.6.9, 00:00:02, Serial0/0/0
C       172.29.6.4/30 is directly connected, Serial0/1/0
L       172.29.6.6/32 is directly connected, Serial0/1/0
C       172.29.6.8/30 is directly connected, Serial0/0/0
L       172.29.6.10/32 is directly connected, Serial0/0/0
C       172.29.6.12/30 is directly connected, Serial0/0/1
L       172.29.6.14/32 is directly connected, Serial0/0/1
R*   0.0.0.0/0 [120/1] via 172.29.6.13, 00:00:02, Serial0/0/1
               [120/1] via 172.29.6.9, 00:00:02, Serial0/0/0

Router#
Router#
Router#
Router#
```

PARTE 2: TABLA DE ENRUTAMIENTO..

c. Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.
d. Los routers Medellín2 y Bogotá2 también presentan redes conectadas directamente y recibidas mediante RIP.
e. Las tablas de los routers restantes deben permitir visualizar rutas redundantes para el caso de la ruta por defecto.
f. El router ISP solo debe indicar sus rutas estáticas adicionales a las directamente conectadas.

DESARROLLO.

```
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.29.0.0/24 is subnetted, 2 subnets
S       172.29.0.0/24 [1/0] via 209.17.220.6
S       172.29.4.0/24 [1/0] via 209.17.220.2
     209.17.220.0/24 is variably subnetted, 4 subnets, 2 masks
C       209.17.220.0/30 is directly connected, Serial0/0/0
L       209.17.220.1/32 is directly connected, Serial0/0/0
C       209.17.220.4/30 is directly connected, Serial0/0/1
L       209.17.220.5/32 is directly connected, Serial0/0/1

Router#
Router#
Router#
Router#
Router#
```

PARTE 3: DESHABILITAR LA PROPAGACION DELPROTOCOLO RIP.

a. Para no propagar las publicaciones por interfaces que no lo requieran se debe deshabilitar la propagación del protocolo RIP, en la siguiente tabla se indican las interfaces de cada router que no necesitan desactivación.

ROUTER	INTERFAZ
Bogota1	SERIAL0/0/1; SERIAL0/1/0; SERIAL0/1/1
Bogota2	SERIAL0/0/0; SERIAL0/0/1
Bogota3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
Medellín1	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/1
Medellín2	SERIAL0/0/0; SERIAL0/0/1
Medellín3	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
ISP	No lo requiere

DESARROLLO.

Esta parte de la configuración ya se realizo durate la parte 1 (configuracion del enrutamiento) al configurar RIP.

PARTE 4: VERIFICACION DEL PROTOCOLO RIP.

a. Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el passive interface para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.

DESARROLLO.

ENRUTAMIENTO MEDELLIN1

```
Router#
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 20 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  Serial0/1/0            2     2
  Serial0/1/1            2     2
  Serial0/0/1            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
           172.29.0.0
Passive Interface(s):
           Serial0/0/0
Routing Information Sources:
           Gateway         Distance      Last Update
           172.29.6.2           120      00:00:24
           172.29.6.14          120      00:00:17
           172.29.6.10          120      00:00:17
 --More--
```

ENRUTAMIENTO MEDELLIN2.

```
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 14 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  Serial0/0/0            2     2
  Serial0/0/1            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
            172.29.0.0
Passive Interface(s):
            GigabitEthernet0/0
Routing Information Sources:
            Gateway         Distance      Last Update
            172.29.6.1            120      00:00:24
            172.29.6.6            120      00:00:03
Distance: (default is 120)
Router#
```

ENRUTAMIENTO MEDELLIN3

```
Sending updates every 30 seconds, next due in 19 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  Serial0/0/0            2     2
  Serial0/0/1            2     2
  Serial0/1/0            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
            172.29.0.0
Passive Interface(s):
            GigabitEthernet0/0
Routing Information Sources:
            Gateway         Distance      Last Update
            172.29.6.9            120      00:00:03
            172.29.6.13           120      00:00:03
            172.29.6.5            120      00:00:20
Distance: (default is 120)
Router#
Router#
Router#
```

ENRUTAMIENTO BOGOTA1.

```
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 21 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  Serial0/0/1            2     2
  Serial0/1/0            2     2
  Serial0/1/1            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
            172.29.0.0
Passive Interface(s):
            Serial0/0/0
Routing Information Sources:
            Gateway         Distance      Last Update
            172.29.3.6            120      00:00:25
            172.29.3.2            120      00:00:25
            172.29.3.10           120      00:00:22
Distance: (default is 120)
Router#
Router#
```

ENRUTAMIENTO BOGOTA2.

```
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 25 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  Serial0/0/0            2     2
  Serial0/0/1            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
            172.29.0.0
Passive Interface(s):
            GigabitEthernet0/0
Routing Information Sources:
            Gateway         Distance      Last Update
            172.29.3.9            120      00:00:16
            172.29.3.14           120      00:00:06
Distance: (default is 120)
Router#
Router#
```

ENRUTAMIENTO BOGOTA3

```
Sending updates every 30 seconds, next due in 12 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface              Send  Recv  Triggered RIP  Key-chain
  Serial0/0/0            2     2
  Serial0/0/1            2     2
  Serial0/1/0            2     2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
           172.29.0.0
Passive Interface(s):
           GigabitEthernet0/0
Routing Information Sources:
           Gateway         Distance      Last Update
           172.29.3.1            120      00:00:22
           172.29.3.5            120      00:00:22
           172.29.3.13           120      00:00:10
Distance: (default is 120)
Router#
Router#
Router#
```

PARTE 4: VERIFICACION DEL PROTOCOLO RIP.

b. Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.

DESARROLLO.

MEDELLIN1

Router(config-router)#do show ip route connected

C 172.29.6.0/30 is directly connected, Serial0/0/1

C 172.29.6.8/30 is directly connected, Serial0/1/0

C 172.29.6.12/30 is directly connected, Serial0/1/1

C 209.17.220.0/30 is directly connected, Serial0/0/0

BOGOTA1

Router(config-router)#do show ip route connected

C 172.29.3.0/30 is directly connected, Serial0/1/0

C 172.29.3.4/30 is directly connected, Serial0/1/1

C 172.29.3.8/30 is directly connected, Serial0/0/1

C 209.17.220.4/30 is directly connected, Serial0/0/0

PARTE 5: CONFIGURAR ENCAPSULAMIENTO Y AUTENTICACION PPP.

a. Según la topología se requiere que el enlace Medellín1 con ISP sea configurado con autenticación PAT.
b. El enlace Bogotá1 con ISP se debe configurar con autenticación CHAT.

DESARROLLO.

ISP

```
Router>ENABLE
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#username MEDELLIN password cisco
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to
down
ISP(config-if)#ppp authentication pap
ISP(config-if)#ppp pap sent-username ISP password cisco
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to
up
ISP(config-if)#EXIT
ISP(config)#username BOGOTA password cisco
ISP(config)#int s0/0/1
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to
down
ISP(config-if)#ppp authentication chap
```

MEDELLIN1

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname MEDELLIN
MEDELLIN(config)#username ISP password cisco
MEDELLIN(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to
down
MEDELLIN(config)#int s0/0/0
MEDELLIN(config-if)#encapsulation ppp
MEDELLIN(config-if)#ppp authentication pap
MEDELLIN(config-if)#ppp pap sent-username MEDELLIN password cisco
```

MEDELLIN(config-if)#end
MEDELLIN#
%SYS-5-CONFIG_I: Configured from console by console
MEDELLIN#ping 209.17.220.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.1, timeout is 2 seconds:
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
.....
Success rate is 0 percent (0/5)

MEDELLIN#ping 209.17.220.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/4/9 ms

BOGOTA
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA
BOGOTA(config)#username ISP password cisco
BOGOTA(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#encapsulation ppp
BOGOTA(config-if)#ppp authentication chap
BOGOTA(config-if)#
BOGOTA(config-if)#

PARTE 6: CONFIGURACION DE PAT.

a. En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.
b. Después de verificar lo indicado en el paso anterior proceda a configurar el NAT en el router Medellín1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Medellín1, cómo diferente puerto.
c. Proceda a configurar el NAT en el router Bogotá1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Bogotá1, cómo diferente puerto.

DESARROLLO.

MEDELLIN 1

MEDELLIN>enable

MEDELLIN#conf t

Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN(config)#ip nat inside source list 1 interface s0/0/0 ovserload

MEDELLIN(config)#

MEDELLIN(config)#ip nat inside source list 1 interface s0/0/0 overload

MEDELLIN(config)#access-list 1 permit 172.29.4.0 0.0.3.255

MEDELLIN(config)#

MEDELLIN(config)# INT S0/0/0

MEDELLIN(config-if)#ip nat outside

MEDELLIN(config-if)# INT S0/0/1

MEDELLIN(config-if)#ip nat intside

MEDELLIN(config-if)#ip nat inside

MEDELLIN(config-if)# INT S0/1/1

MEDELLIN(config-if)#ip nat inside

MEDELLIN(config-if)#INT S0/1/0

MEDELLIN(config-if)#ip nat inside

MEDELLIN(config-if)#

BOGOTA1

BOGOTA>ENABLE

BOGOTA#conf t

Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA(config)#ip nat inside source list 1 interface s0/0/0 overload

BOGOTA(config)#access-list 1 permit 172.29.0.0 0.0.3.255

BOGOTA(config)#int s0/0/0

BOGOTA(config-if)#ip nat outside

BOGOTA(config-if)#int s0/1/0

BOGOTA(config-if)#ip nat inside

BOGOTA(config-if)#int s0/1/1

BOGOTA(config-if)#ip nat inside

BOGOTA(config-if)#

PARTE 7: CONFIGURACION DEL SERVICIO DHCP.

a. Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.

DESARROLLO.

MEDELLIN2

Router>enable

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5

Router(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.133

Router(config)#ip dhcp pool MEDELLIN2

Router(dhcp-config)#network 172.29.4.0 255.255.255.128

Router(dhcp-config)#default-router 172.29.4.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#exit

Router(config)#ip dhcp pool MEDELLIN3

Router(dhcp-config)#network 172.29.4.128 255.255.255.128

Router(dhcp-config)#default-router 172.29.4.129

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#exit

MEDELLIN3

Router>ENABLE

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#int g0/0

Router(config-if)#ip helper-address 172.29.6.5

Router(config-if)#

PARTE 7: CONFIGURACION DEL SERVICIO DHCP.

b. El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.
c. Configurar la red Bogotá2 y Bogotá3 donde el router Medellín2 debe ser el servidor DHCP para ambas redes Lan.
d. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

DESARROLLO.

BOGOTA3

Router>enable

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#ip dhcp excluded-address 172.29.1.1 172.29.1.5

Router(config)#ip dhcp excluded-address 172.29.0.1 172.29.0.5

Router(config)#ip dhcp pool BOGOTA2

Router(dhcp-config)#NETWORK 172.29.1.0 255.255.255.0

Router(dhcp-config)#DEFAULT-ROUTER 172.29.1.1

Router(dhcp-config)#DEFAULT-ROUTER 172.29.1.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#ip dhcp pool BOGOTA3

Router(dhcp-config)#NETWORK 172.29.0.0 255.255.255.0

Router(dhcp-config)#DEFAULT-ROUTER 172.29.0.1

Router(dhcp-config)#dns-server 8.8.8.8

Router(dhcp-config)#

BOGOTA3

Router>ENABLE

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#int g0/0

Router(config-if)#ip helper-address 172.29.3.13

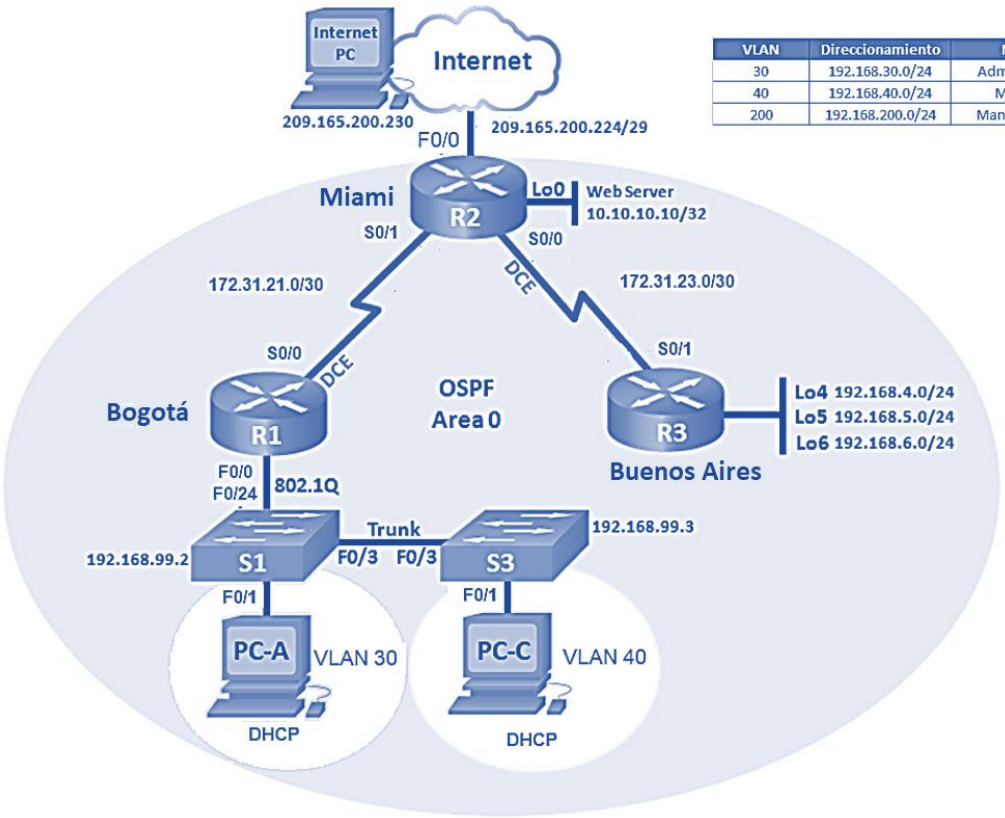
Router(config-if)#

PING DE EXTREMO A EXTREMO.

```
Pinging 172.29.1.6 with 32 bytes of data:

Reply from 172.29.1.6: bytes=32 time=4ms TTL=126
Reply from 172.29.1.6: bytes=32 time=2ms TTL=126
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126
Reply from 172.29.1.6: bytes=32 time=2ms TTL=126

Ping statistics for 172.29.1.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 4ms, Average = 2ms

C:\>ping 172.29.4.6

Pinging 172.29.4.6 with 32 bytes of data:

Reply from 172.29.4.6: bytes=32 time=7ms TTL=123
Reply from 172.29.4.6: bytes=32 time=4ms TTL=123
Reply from 172.29.4.6: bytes=32 time=5ms TTL=123
Reply from 172.29.4.6: bytes=32 time=4ms TTL=123

Ping statistics for 172.29.4.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 7ms, Average = 5ms

C:\>ping 172.29.4.134

Pinging 172.29.4.134 with 32 bytes of data:

Request timed out.
Reply from 172.29.4.134: bytes=32 time=4ms TTL=123
Reply from 172.29.4.134: bytes=32 time=4ms TTL=123
Reply from 172.29.4.134: bytes=32 time=4ms TTL=123

Ping statistics for 172.29.4.134:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\>
```

ESCENARIO 2

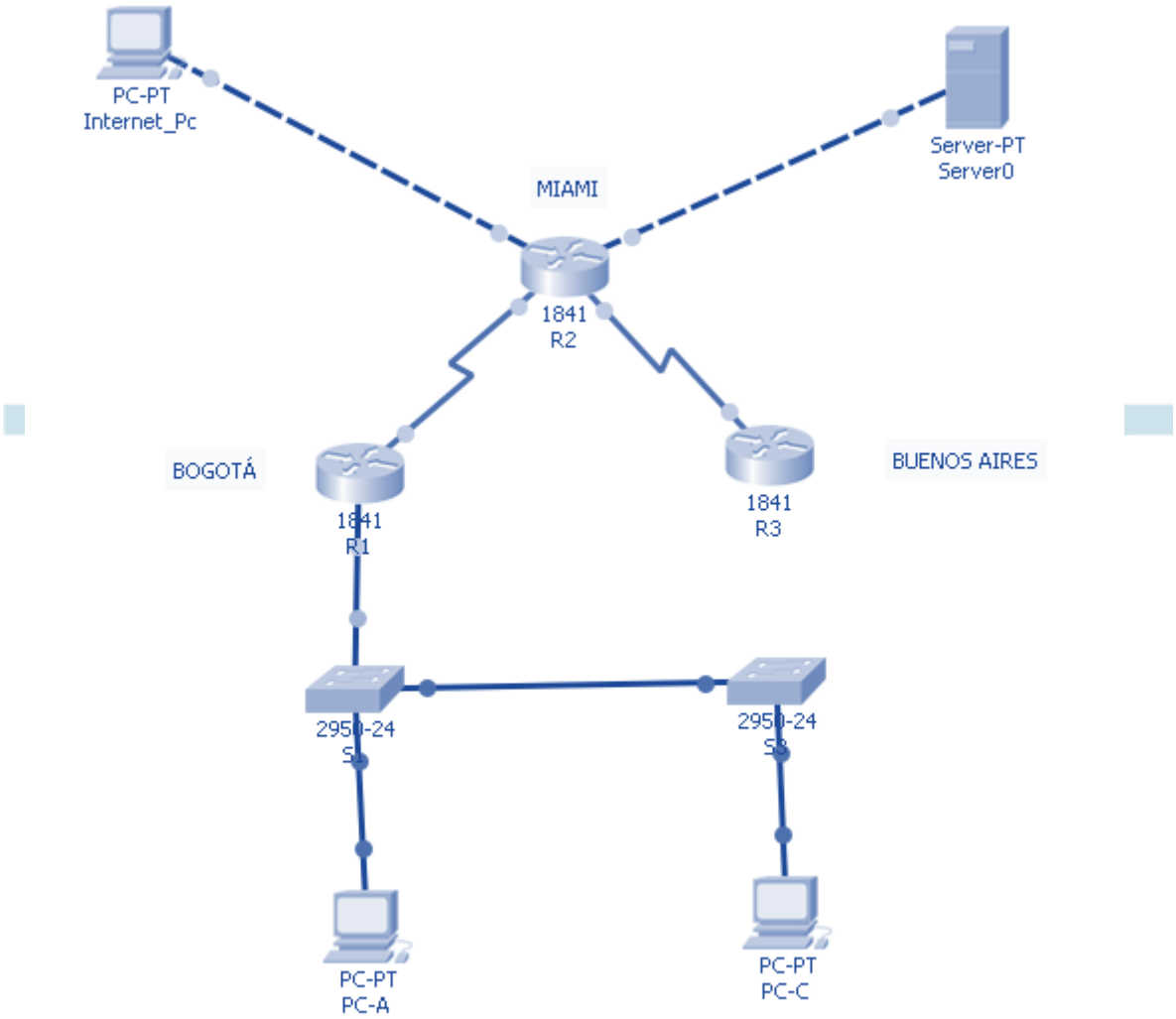
Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.



VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

CONFIGURACIONES ESCENARIO 2

1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario



DESARROLLO

CONFIGURACIÓN BÁSICA R1P

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA
BOGOTA(config)#no ip domain-lookup
BOGOTA(config)#enable secret class
BOGOTA(config)#line con 0
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login
```

BOGOTA(config-line)#exit
BOGOTA(config)#service password-encryption
BOGOTA(config)#banner motd $ Acceso no autorizado o prohibido!! $
BOGOTA(config)#

CONFIGURACIÓN BÁSICA R2

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MIAMI
MIAMI(config)# no ip domain-lookup
MIAMI(config)#enable secret class
MIAMI(config)#line con 0
MIAMI(config-line)#password cisco
MIAMI(config-line)#login
MIAMI(config-line)#exit
MIAMI(config)#service password-encryption
MIAMI(config)#banner motd $ Acceso no autorizado o prohibido!! $
MIAMI(config)#

CONFIGURACIÓN BÁSICA R3

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BUENOSAIRES
BUENOSAIRES(config)#no ip domain-lookup
BUENOSAIRES(config)#enable secret class
BUENOSAIRES(config)#line con 0
BUENOSAIRES(config-line)#password cisco
BUENOSAIRES(config-line)#login
BUENOSAIRES(config-line)#exit
BUENOSAIRES(config)#service password-encryption
BUENOSAIRES(config)#banner motd $ Acceso no autorizado o prohibido!! $
BUENOSAIRES(config)#

CONFIGURACIÓN BÁSICA S1

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#no ip domain-lookup
S1(config)#enable secret class
S1(config)#line con 0
S1(config-line)#password cisco
S1(config-line)#login
S1(config-line)#exit

S1(config)#service password-encryption
S1(config)#banner motd $ Solo personal autorizado!! $
S1(config)#

CONFIGURACIÓN BÁSICA S3

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#no ip domain-lookup
S3(config)#enable secret class
S3(config)#line con 0
S3(config-line)#password cisco
S3(config-line)#login
S3(config-line)#exit
S3(config)#service password-encryption
S3(config)#banner motd $ Solo personal autorizado!! $
S3(config)#

2. **Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:**

OSPFv2 area 0

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	5.5.5.5
Router ID R3	8.8.8.8
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	256 Kb/s
Ajustar el costo en la métrica de S0/0 a	9500

VERIFICAR INFORMACION DE OSPF

DESARROLLO.

BOGOTA(config)#router ospf 1

BOGOTA(config-router)#router-id 1.1.1.1

BOGOTA(config-router)#network 172.31.21.0 0.0.0.3 area 0

BOGOTA(config-router)#network 192.168.30.0 0.0.0.255 area 0

BOGOTA(config-router)#network 192.168.40.0 0.0.0.255 area 0

BOGOTA(config-router)#network 192.168.200.0 0.0.0.255 area 0

BOGOTA(config-router)#

BOGOTA(config-router)#passive-interface f0/0.30

BOGOTA(config-router)#passive-interface f0/0.40

BOGOTA(config-router)#passive-interface f0/0.200

BOGOTA(config-router)#

BOGOTA(config)#int s0/0/0

BOGOTA(config-if)#bandwidth 256

BOGOTA(config-if)#ip ospf cost 9500

BOGOTA(config-if)#

MIAMI(config)#router ospf 1

MIAMI(config-router)#router-id 5.5.5.5

MIAMI(config-router)#network 172.31.21.0 0.0.0.3 area 0

MIAMI(config-router)#

00:16:21: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/1/0 from LOADING to FULL, Loading Done

MIAMI(config-router)#network 172.31.23.0 0.0.0.3 area 0

MIAMI(config-router)#network 10.10.10.0 0.0.0.255 area 0

MIAMI(config-router)#

MIAMI(config-router)#passive-interface f0/1

MIAMI(config-router)#exit

MIAMI(config)#int s0/1/1

MIAMI(config-if)#bandwidth 256

MIAMI(config-if)#ip ospf cost 9500

MIAMI(config-if)#

BUENOSAIRES(config)#router ospf 1

BUENOSAIRES(config-router)#router-id 8.8.8.8

BUENOSAIRES(config-router)#network 172.31.23.0 0.0.0.3 area 0

BUENOSAIRES(config-router)#

00:25:00: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/0 from LOADING to FULL, Loading Done

BUENOSAIRES(config-router)#network 192.168.4.0 0.0.3.255 area 0

BUENOSAIRES(config-router)#passive-interface lo4

BUENOSAIRES(config-router)#passive-interface lo5

BUENOSAIRES(config-router)#passive-interface lo6

BUENOSAIRES(config-router)#exit

BUENOSAIRES(config)#int s0/0/0

BUENOSAIRES(config-if)#bandwidth 256

BUENOSAIRES(config-if)#ip ospf cost 9500

BUENOSAIRES(config-if)#

```
MIAMI(config)#router ospf 1
MIAMI(config-router)#router-id 5.5.5.5
MIAMI(config-router)#network 172.31.21.0 0.0.0.3 area 0
MIAMI(config-router)#
00:16:21: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/1/0
from LOADING to FULL, Loading Done

MIAMI(config-router)#network 172.31.23.0 0.0.0.3 area 0
MIAMI(config-router)#network 10.10.10.0 0.0.0.255 area 0
MIAMI(config-router)#
MIAMI(config-router)#passive-interface f0/1
MIAMI(config-router)#exit
MIAMI(config)#int s0/1/1
MIAMI(config-if)#bandwidth 256
MIAMI(config-if)#ip ospf cost 9500
MIAMI(config-if)#
```

```
BOGOTA(config)#router ospf 1
BOGOTA(config-router)#router-id 1.1.1.1
BOGOTA(config-router)#network 172.31.21.0 0.0.0.3 area 0
BOGOTA(config-router)#network 192.168.30.0 0.0.0.255 area 0
BOGOTA(config-router)#network 192.168.40.0 0.0.0.255 area 0
BOGOTA(config-router)#network 192.168.200.0 0.0.0.255 area 0
BOGOTA(config-router)#
```

```
BUENOSAIRES(config)#router ospf 1
BUENOSAIRES(config-router)#router-id 8.8.8.8
BUENOSAIRES(config-router)#network 172.31.23.0 0.0.0.3 area 0
BUENOSAIRES(config-router)#
00:25:00: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/0
from LOADING to FULL, Loading Done
BUENOSAIRES(config-router)#network 192.168.4.0 0.0.3.255 area 0
BUENOSAIRES(config-router)#passive-interface lo4
BUENOSAIRES(config-router)#passive-interface lo5
BUENOSAIRES(config-router)#passive-interface lo6
BUENOSAIRES(config-router)#exit
BUENOSAIRES(config)#int s0/0/0
BUENOSAIRES(config-if)#bandwidth 256
BUENOSAIRES(config-if)#ip ospf cost 9500
```

- **Visualizar tablas de enrutamiento y routers conectados por OSPFv2**

```
MIAMI#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address
Interface
1.1.1.1           0   FULL/  -        00:00:34    172.31.21.1
Serial0/1/0
8.8.8.8           0   FULL/  -        00:00:31    172.31.23.2
Serial0/1/1
MIAMI#
```

- **Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface**

```
MIAMI#show ip ospf interface

FastEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.10/24, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State WAITING, Priority 1
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    No Hellos (Passive interface)
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/1/1 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:00
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 8.8.8.8
  Suppress hello for 0 neighbor(s)
Serial0/1/0 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 64
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:09
  Index 3/3, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 1.1.1.1
  Suppress hello for 0 neighbor(s)
```

- **Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router**

```
router ospf 1
 router-id 5.5.5.5
 log-adjacency-changes
 passive-interface FastEthernet0/1
 network 172.31.21.0 0.0.0.3 area 0
 network 172.31.23.0 0.0.0.3 area 0
 network 10.10.10.0 0.0.0.255 area 0
!
```

- **Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.**

S1(config)#

S1(config)#int f0/3

S1(config-if)#switchport mode trunk

S1(config-if)#switchport trunk native vlan 1

S1(config-if)#

S1(config)#int f0/24

S1(config-if)#switchport mode trunk

S1(config-if)#switchport trunk native vlan 1

S1(config-if)#no shutdown

S1(config-if)#

S1(config)#int range fa0/1-2, fa0/4-24

S1(config-if-range)#switchport mode access

S1(config-if-range)#

S1(config)#int f0/1

S1(config-if)#switchport mode access

S1(config-if)#switchport access vlan 30

S1(config-if)#int range fa0/1-2, fa0/4-24

S1(config-if-range)#shutdown

S1(config)#int vlan 200

S1(config-if)#

%LINK-5-CHANGED: Interface Vlan200, changed state to up

S1(config-if)#ip address 192.168.99.2 255.255.255.0

S1(config-if)#

S3#conf t

Enter configuration commands, one per line. End with CNTL/Z.

S3(config)#vlan 30

S3(config-vlan)#name ADMINISTRACION

S3(config-vlan)#vlan 40

S3(config-vlan)#name MERCADEO

S3(config-vlan)#vlan 200

S3(config-vlan)#name MANTENIMIENTO

S3(config-vlan)#exit

S3(config)#

S3(config)#int vlan 200

S3(config-if)#

%LINK-5-CHANGED: Interface Vlan200, changed state to up

S3(config-if)#ip address 192.168.99.3 255.255.255.0

S3(config-if)#

S3(config)#ip default-gateway 192.168.99.1

S3(config)#

S3#

S3(config)#int f0/3

S3(config-if)#switchport mode trunk

S3(config-if)#switchport trunk native vlan 1

S3(config-if)#

S3(config)#int range fa0/1-2, fa0/4-24

S3(config-if-range)#switchport mode access

S3(config-if-range)#

S3(config)#int f0/1

S3(config-if)#switchport mode access

S3(config-if)#switchport access vlan 40

S3(config-if)#int range fa0/1-2, fa0/4-24

S3(config-if-range)#shutdown

BOGOTA(config)#int f0/0.30

BOGOTA(config-subif)#description accounting LAN

BOGOTA(config-subif)#encapsulation dot1q 30

BOGOTA(config-subif)#ip address 192.168.30.1 255.255.255.0

BOGOTA(config-subif)#

BOGOTA(config)#int f0/0.40

BOGOTA(config-subif)#description accounting LAN

BOGOTA(config-subif)#encapsulation dot1q 40

BOGOTA(config-subif)#ip address 192.168.40.1 255.255.255.0

BOGOTA(config-subif)#

BOGOTA(config)#int f0/0.200

BOGOTA(config-subif)#description accounting LAN

BOGOTA(config-subif)#encapsulation dot1q 200

BOGOTA(config-subif)#ip address 192.168.200.1 255.255.255.0

BOGOTA(config-subif)#

1. **En el Switch 3 deshabilitar DNS lookup**

S3(config)#no ip domain-lookup

2. **Asignar direcciones IP a los Switches acorde a los lineamientos.**

S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#

S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#

S3(config)#ip default-gateway 192.168.99.1
S3(config)#

3. **Desactivar todas las interfaces que no sean utilizadas en el esquema de red.**

DESARROLLO.

S1(config-if)#int range fa0/1-2, fa0/4-24
S1(config-if-range)#shutdown

S3(config-if)#int range fa0/1-2, fa0/4-24
S3(config-if-range)#shutdown

4. **Implement DHCP and NAT for IPv4**

DESARROLLO.

MIAMI(config)#user webuser privilege 15 secret cisco12345
MIAMI(config)#ip nat inside source static 10.10.10.10 209.165.200.229
MIAMI(config)#int f0/0
MIAMI(config-if)#ip nat outside
MIAMI(config-if)#exit
MIAMI(config)#int f0/1
MIAMI(config-if)#ip nat inside
MIAMI(config-if)#
MIAMI(config-if)#exit
MIAMI(config)#access-list 1 permit 192.168.30.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.40.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.4.0 0.0.3.255
MIAMI(config)#ip nat pool INTERNET 209.165.200.225 209.165.200.229 netmask 255.255.255.248
MIAMI(config)#

5. **Configurar R1 como servidor DHCP para las VLANs 30 y 40.**

DESARROLLO.

BOGOTA(config)#ip dhcp pool ADMINISTRACION
BOGOTA(dhcp-config)#dns-server 10.10.10.11
BOGOTA(dhcp-config)#default-router 192.168.30.1
BOGOTA(dhcp-config)#network 192.168.30.0 255.255.255.0
BOGOTA(dhcp-config)#

BOGOTA(config)#ip dhcp pool MERCADEO
BOGOTA(dhcp-config)#dns-server 10.10.10.11
BOGOTA(dhcp-config)#default-router 192.168.40.1
BOGOTA(dhcp-config)#network 192.168.40.0 255.255.255.0
BOGOTA(dhcp-config)#

6. **Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.**

DESARROLLO.

```
BOGOTA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
BOGOTA(config)#ip dhcp excluded-address 192.168.30.1 192.168.40.30
BOGOTA(config)#
```

7. **Configurar NAT en R2 para permitir que los host puedan salir a internet**

DESARROLLO.

```
MIAMI(config)#int f0/0
MIAMI(config-if)#ip nat outside
MIAMI(config-if)#exit
MIAMI(config)#int f0/1
MIAMI(config-if)#ip nat inside
MIAMI(config-if)#
```

8. **Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.**

DESARROLLO.

```
MIAMI(config)#access-list 1 permit 192.168.30.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.40.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.4.0 0.0.3.255
MIAMI(config)#ip nat pool INTERNET 209.165.200.225 209.165.200.229
netmask 255.255.255.248

MIAMI(config)#ip access-list standard ADMIN
MIAMI(config-std-nacl)#permit host 172.31.21.1
MIAMI(config-std-nacl)#exit
MIAMI(config)#line vty 0 4
MIAMI(config-line)#access-class ADMIN in
MIAMI(config-line)#
```

9. **Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.**

DESARROLLO

MIAMI(config)#access-list 100 permit tcp any host 209.165.200.229 eq www
MIAMI(config)#access-list 100 permit icmp any any echo-reply

10. **Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute.**

```
MIAMI#show access-lists
Standard IP access list 1
    10 permit 192.168.30.0 0.0.0.255
    20 permit 192.168.40.0 0.0.0.255
    30 permit 192.168.4.0 0.0.3.255
Standard IP access list ADMIN
    10 permit host 172.31.21.1
Extended IP access list 100
    10 permit tcp any host 209.165.200.229 eq www
    20 permit icmp any any echo-reply
```

```
BOGOTA#ping 209.165.200.230

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2
seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/5/18
ms

BOGOTA#
```

CONCLUSIONES

De acuerdo con los contenidos vistos dentro del curso Diplomado de Profundización Cisco CCNA, se logra conceptualizar con claridad el término red, que es un conjunto de dispositivos conectados por medio de cables, ondas, señales, y demás métodos de transporte de datos para compartir información y servicios.

El protocolo DHCP es diseñado para ahorrar tiempo en la gestión de direccionamiento IP en una red extensa. Este servicio se encuentra activo en un servidor donde administra las direcciones de la red.

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